REMARKS

In the Office Action mailed April 4, 2007, the Examiner rejected claims 1-21 under 35 U.S.C. § 103(a). Applicants have amended claims 1, 3, 4, 8-10, and 15-17 to clarify that the phase and frequency offset are both determined by comparing the in-phase (I) and quadrature (Q) components <u>of a differential phase shift keying (DPSK) input signal</u>. Applicants have also amended claims 3 and 4 for antecedent basis reasons. These amendments do not add new matter. Applicants submit that claims 1-21 as written are in condition for allowance and respectfully request notice to this effect.

1.   Response to §103(a) Rejection Based on AAAPA/*Dutta*/*Chung*

The Examiner rejected claims 1-3, 5, 7-9, 11-12, 14-16, 18-19, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art of the current application (AAPA) in view of U.S. Patent No. 5,313,493 (*Dutta*) and U.S. Patent Publication No. 2004/0190655 (*Chung*). In amended claim 1, Applicants recite a DPSK receiver to receive a DPSK input signal transmitted by a DPSK transmitter. Further, in amended claims 8 and 15, Applicants recite a method and system for demodulating a DPSK input signal that includes similar elements to the DPSK receiver of claim 1. The claimed DPSK receiver includes, among other elements, (1) a differential demodulator to determine a demodulated phase by comparing I and Q components of the input signal with a first delayed, conjugated version of the I and Q components of the input signal, (2) a frequency offset calculation circuit to determine a frequency offset between an oscillator in the DPSK receiver and an oscillator in the DPSK transmitter by comparing the I and Q components of the input signal with a second delayed, conjugated version of the I and Q components of the input signal, and (3) a frequency correction circuit to correct the demodulated phase using the frequency offset into a corrected phase. Advantageously, the claimed DPSK receiver provides continuous frequency offset tracking and correction based on the input signal. *See, e.g., Applicants' Specification*, P0015 and P0039-P0040, P0049.

In contrast, AAPA describes a DPSK demodulator that performs frequency offset estimation only during correlation of the header of an input signal. *See, e.g., Applicants' Specification*, P0011–P0014. In the DPSK demodulator of AAPA, a complex correlator receives an input signal, correlates it to a known header, and generates an indication of a degree of correlation between the input signal and the known header (e.g., a percentage of correlation). *See, e.g., Applicants' Specification*, P0008. The complex correlator may communicate with a best sample selection circuit, which determines the best sample of the input signal to use for processing based on the indication generated in the complex correlator. *See, e.g., Applicants' Specification*, P0008. The complex correlator may also provide the generated indication as input to a frequency offset estimator, which then determines frequency offset based on the input from the complex correlator. *See, e.g., Applicants' Specification*, P0011. In this respect, once the correlation of the input signal to the known header is complete, the DPSK demodulator deactivates the complex correlator by throwing a switch. *See, e.g., Applicants' Specification*, P0009. In turn, the frequency offset estimator no longer receives an input from the deactivated complex correlator, and thus does not track the frequency offset of the input signal for the remainder of the input signal. *See, e.g., Applicants' Specification*, P0011.

Because the DPSK demodulator of AAPA includes a frequency offset estimator that determines frequency offset based on the input from the complex correlator, AAPA does not show or suggest a DPSK receiver with a frequency offset calculation circuit that determines a frequency offset by comparing the I and Q components of the input signal with a second delayed, conjugated version of the I and Q components of the input signal, as recited in claims 1, 8, and 15.

The Examiner cites *Dutta* for the teaching of means for converting the input signal to I and Q components. *See Office Action*, p. 7. However, this teaching clearly does not overcome at least the deficiencies as described above.

The Examiner cites *Chung* for the teaching of a frequency offset calculation circuit to determine a frequency offset by comparing the I and Q components with a second delayed, conjugated version of the I and Q components. *See Office Action*, p. 8. In this respect, the Examiner asserts that it would have been obvious to use the frequency determining system of *Chung* as a substitute for the frequency offset estimator (as well as the phase adjuster) in AAPA. *See Office Action*, p. 8. Applicants respectfully disagree.

The cited frequency determining system of *Chung* determines frequency offset based on input symbols, which are part of an input signal. *See, e.g., Chung*, P0004-P0005. In contrast, the frequency offset estimator of AAPA determines frequency offset based on the input from the complex correlator, which is a generated indication of the degree of correlation between an input signal and a known header. *See, e.g., Applicants' Specification*, P0008, P0011. This generated indication is different than an input symbol. As such, it would not be reasonable or logical to adapt the frequency offset estimator of AAPA by replacing it with the cited frequency determining system of *Chung*, because the frequency offset estimator of AAPA receives a different input type than the cited frequency determining system of *Chung*. Further, it would not be reasonable or logical to modify the input of the frequency offset estimator of AAPA based on the cited teaching of *Chung*, because the cited teaching does not address DPSK receiver with a correlator. Thus, the cited teaching of *Chung* does not overcome the deficiencies of AAPA.

Because the combination of AAPA, *Dutta, and Chung* does not show or suggest all of the elements recited in claims 1, 8, and 15, Applicants submit that claims 1, 8, and 15 are not obvious in light of the combination of AAPA, *Dutta, and Chung*. Further, because claims 2, 3, 5, 7, 9, 11, 12, 14, 16, 18, 19, and 21 depend from claims 1, 8, and 15, Applicants submit that claims 2, 3, 5, 7, 9, 11,

12, 14, 16, 18, 19, and 21 are not obvious in light of the combination of AAPA, *Dutta, and Chung* for at least the reasons described with reference to claims 1, 8, and 15.

Accordingly, Applicants respectfully request withdrawal of these rejections under 35 U.S.C. § 103(a).

2.   Response to §103(a) Rejection Based on AAAPA/*LaBerge*

The Examiner rejected claims 1, 3-5, 8-10, 12, 15, and 17 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of U.S. Patent No. 5,142,287 (*LaBerge*). As previously described, AAPA does not show or suggest a DPSK receiver with a frequency offset calculation circuit that determines a frequency offset by comparing the I and Q components of the input signal with a second delayed, conjugated version of the I and Q components of the input signal, as recited in claims 1, 8, and 15.

The Examiner cites *LaBerge* for the teachings of (1) means for converting the input signal to I and Q components and (2) a frequency offset calculation circuit to determine a frequency offset by comparing the I and Q components with a second delayed, conjugated version of the I and Q components. *See Office Action*, p. 12. However, similar to *Chung*, the cited system in *LaBerge* determines frequency offset based on input signals, as opposed to an output of a correlator. *See, e.g., LaBerge*, Fig. 7. As such, it would not be reasonable or logical to adapt the frequency offset estimator of AAPA by replacing it with the cited components of *LaBerge* for at least the reasons described with reference to *Chung*. Further, it would not be reasonable or logical to modify the input of the frequency offset estimator of AAPA based on the cited teaching of *LaBerge* for at least the reasons described with reference to *Chung*. Thus, the cited teaching of *LaBerge* does not overcome the deficiencies of AAPA.

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Because the combination of AAPA and *LaBerge* does not show or suggest all of the elements recited in claims 1, 8, and 15, Applicants submit that claims 1, 8, and 15 are not obvious in light of the combination of AAPA and *LaBerge*. Further, because claims 3-5, 9, 10, 12, and 17 depend from claims 1, 8, and 15, Applicants submit that claims 3-5, 9, 10, 12, and 17 are not obvious in light of the combination of AAPA and *LaBerge* for at least the reasons described with reference to claims 1, 8, and 15.

Accordingly, Applicants respectfully request withdrawal of these rejections under 35 U.S.C. § 103(a).

3. Response to §103(a) Rejection Based on AAAPA/*LaBerge*/*Legrand*

The Examiner rejected claims 6, 13, and 20 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of *LaBerge* and U.S. Patent No. 6,674,822 (*Legrand*). Claims 6, 13, and 20 depend from claims 1, 8, and 15. As previously described, the combination of AAPA and *LaBerge* does not show or suggest a DPSK receiver with a frequency offset calculation circuit that determines a frequency offset by comparing the I and Q components of the input signal with a second delayed, conjugated version of the I and Q components of the input signal, as recited in claims 1, 8, and 15.

The Examiner cites *Legrand* for the teaching of an optimal sample calculation circuit determining the optimal sample as the sample associated with a peak amplitude of each sample in each sample interval. *See Office Action*, p. 15. However, this cited teaching fails to overcome the deficiencies of the combination of AAPA and *LaBerge*. Thus, the combination of AAPA, *LaBerge*, and *Legrand* does not show or suggest all of the elements recited in claims 6, 13, and 20.

Accordingly, Applicants respectfully request withdrawal of these rejections under 35 U.S.C. § 103(a).

CONCLUSION

In light of the above amendments and remarks, Applicants submit that the present application is in condition for allowance and respectfully request notice to this effect. The Examiner is requested to contact Applicants' representative below if any questions arise or he may be of assistance to the Examiner.

Respectfully submitted,

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